Summary of Fishery Surveys
Island Chain of Lakes, Rusk County, 2015–2016

WDNR's Fisheries Management Team from Park Falls completed fyke netting and electrofishing surveys in 2015–2016 to assess the status of important fish populations in Chain, Clear, Island, and McCann lakes, collectively known as the Island Chain of Lakes. Fall fyke netting in October 2015 yielded useful information on black crappies. Fyke nets set in late April 2016 targeted primarily muskellunge, but they also helped us characterize walleye, northern pike, and yellow perch populations. An electrofishing survey on May 24–25, 2016 documented the abundance and size structure of smallmouth bass, largemouth bass, and bluegill populations. Quality, preferred, and memorable sizes referenced in this summary are based on standard proportions of world record lengths developed for each species by the American Fisheries Society. "Keeper size" is our own description applied to bluegill ≥ 7 inches long and black crappie ≥ 9 inches long, based on known angler behavior.

Survey Effort

On October 19, 2015, when water temperatures ranged from 54 to 56°F, we set four fyke nets in McCann Lake and five nets in Chain Lake, fished them for two nights, and then moved five nets to Island Lake and three to Clear Lake, where they fished for two nights. One net fished two additional nights in McCann Lake. In late April 2016 when water temperatures were 49–52°F, we set three to six fyke nets in each lake at locations selected to intercept spawning muskellunge, opting this time to focus our spring netting effort on muskies, since WDNR's Treaty Fishery Assessment Team had recently

	Surface Area (acres)	Fall fyke netting October 19-23, 2015	Spring fyke netting April 25-29, 2016	Electrofishing May 24-25, 2016			
		Net-nights	Net-nights	Gamefish		Panfish	
				Miles	Hours	Miles	Hours
Island Lake	526	10	12	4.00	1.77	1.00	0.45
McCann Lake	133	10	8	2.00	0.88	0.50	0.23
Clear Lake	95	6	6	0.50	0.30	0.50	0.30
Chain Lake	468	10	10	3.03	1.25	0.50	0.22
Combined	1,222	36	36	9.53	4.20	2.50	1.20

estimated adult walleye population density in 2012. Our late-April nets fished overnight for two nights in each lake. With water temperature averaging 69°F, our late May electrofishing surveys were well-timed to capture black bass and bluegills during their spawning activities. In all, we sampled 9.5 miles of shoreline in 4.2 hours, including 2.5 miles sub-sampled for all fish species. Our electrofishing circuit around Clear Lake was curtailed by equipment malfunction, though we managed to sample all species along 28% of the shoreline.

Habitat Characteristics

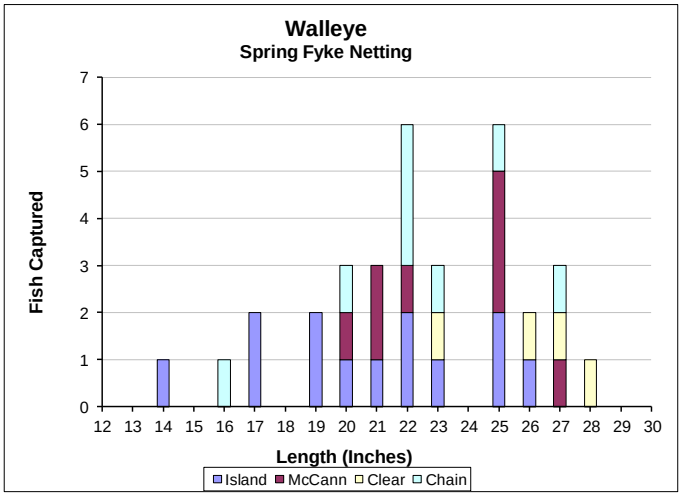
The Island Chain of Lakes is a recreational impoundment formed by an 11-foot-high concrete dam on Swift Creek, tributary to Fireside Lakes. The Chain's 20 shoreline miles are highly developed with many residences, piers, boat lifts, and rafts. The four lakes share similar habitat conditions (range of maximum depth = 38–74 feet; proportions ≤ 3 feet deep = 7–16%), though Chain and Island lakes seem to have more rocky substrates. Moderate concentrations of nutrients rarely result in high rates of organic production, so severe algae blooms are uncommon. The hard water reservoir supports a diverse plant community; northern water milfoil and several pondweeds were common in 2004, including the invasive curly-leaf pondweed. Good water clarity allows rooted plants to grow at depths exceeding 12 feet. After rusty crayfish numbers declined in the late 1980s, aquatic plants became abundant again and formed some dense stands in shallow areas. Pronounced and stable thermal stratification in summer leads to very low dissolved oxygen concentrations in the lower portion of water column. Similar water quality, plant and fish communities, and physical habitat among the four lakes allow us to manage the Chain's fishery as a single unit.

Summary of Results

We captured 15 fish species in our recent fyke netting and electrofishing surveys. Muskellunge and largemouth bass were the most prevalent predators, while bluegill and black crappie made up the majority of the panfish community. Near the northernmost extent of their range in Wisconsin, we rated longnose gar as "common" in the Island Chain with individuals as long as 38.5 inches in our samples. We captured four smallmouth bass (10-13") in Island and Chain lakes and very few yellow perch in all four lakes.

Walleye

	Number per net-night ≥ 10"	Quality Size ≥ 15"	Preferred Size ≥ 20"	Memorable Size ≥ 25"
Island	1.1	92%	62%	23%
McCann	1.0	100%	100%	50%
Clear	0.7	100%	100%	75%
Chain	0.8	100%	88%	25%
Combined	0.9	97%	82%	36%

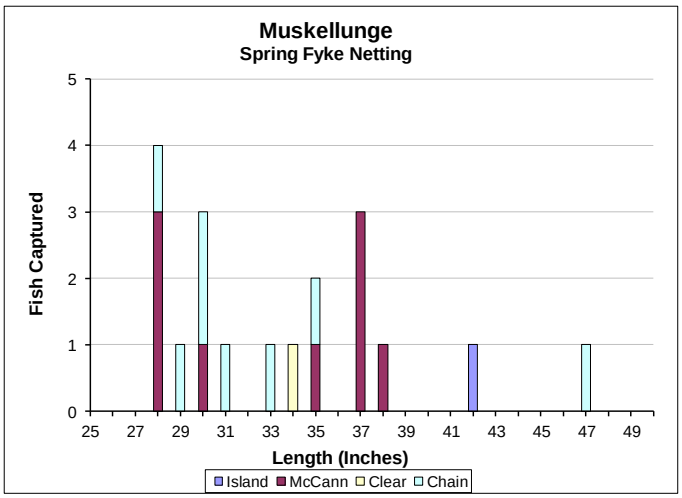


With water temperature above the optimal range, our spring netting survey likely began after peak walleye spawning activity had subsided. Although walleye were not the main target of spring fyke nets, our low netting catch rates reinforced earlier findings that walleye population density (estimated in 2012 at 0.7 adult/acre in Chain Lake, 0.6 adult/acre in Island Lake, and immeasurably low in the other lakes) falls short of our objective to have 2–4 adults/acre throughout the Chain. A high proportion of the walleye in each lake was comprised of old fish 25 inches or longer, suggesting that the rate at which

young recruits are added to the population remains low, despite several management efforts underway since 2010 to restore the fishery that once sustained itself by natural reproduction. Furthermore, electrofishing capture rates were consistently very low (≤ 0.5 age-0 walleye per mile) in four surveys completed in fall 2012–2016 on Island and Chain lakes for a broad-scale evaluation of interactions between walleye and largemouth bass populations. To restore a self-sustaining walleye population with the desired adult density and size structure, we implemented a three-pronged strategy to stock 10 large walleye fingerlings per acre in alternate years, to allow and encourage anglers to keep largemouth bass of any size, and to protect walleyes from angling harvest until they reach 18 inches. If stocking and those special harvest regulations in effect since 2011 do not show promising signs of walleye population recovery in annual recruitment surveys and the next adult assessment scheduled in spring 2022, we may need to adjust our goals to reflect more realistic expectations for walleye and panfish populations in the Island Chain of Lakes. Walleyes add important predatory control on bluegill and crappie populations. Increasing the predatory pressure on panfish would lower their abundance, reduce food competition, improve growth rates, and increase the share of larger bluegills and crappies that anglers prefer to eat. We have not yet documented a walleye year class naturally produced in these lakes in many years. However, our fall electrofishing capture rates (averaging 5.2 yearlings/mile in 2016 and 1.5 yearlings/mile in 2014) do show the survival and growth of the walleye stocked into the Island Chain at rates of 10 large fingerlings/acre in 2015 and 5/acre in 2013. Additionally, our spring 2016 fyke nets captured several intermediate-size walleye presumed to be 2–4 years old. Because the fixed-crest dam acts as an overflow weir, there is currently no option to manipulate water levels and habitat conditions to promote walleye population recovery.

Muskellunge

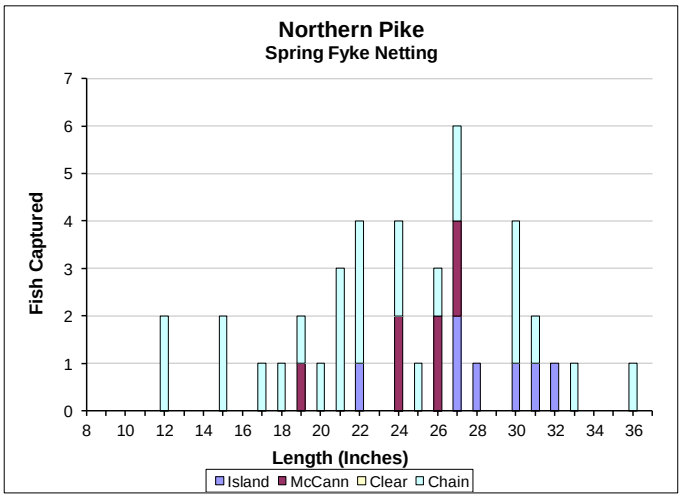
	Number per net-night ≥ 20"	Quality Size ≥ 30"	Preferred Size ≥ 38"	Memorable Size ≥ 42"
Island	0.1	100%	100%	100%
McCann	1.1	67%	11%	0%
Clear	0.2	100%	0%	0%
Chain	0.8	75%	13%	13%
Combined	0.5	74%	16%	11%



Our spring netting survey occurred within the range of water temperature when muskellunge typically spawn. Catch rates were considerably higher in the Chain and McCann lakes where we first deployed our nets, compared to those in Island and Clear lakes where we concluded our spring netting survey. While sample sizes were again small, our capture rate of muskellunge ≥ 20 inches long suggested an adult population in low to moderate abundance with preferred-size fish in three lakes and memorable-size fish in two—a status similar to what we found in our 2010 assessment. Recruitment stems from a combination of natural reproduction and stocking 0.5 or one large (10- to 12-inch) fingerling per acre usually into Chain Lake in alternate years. With demonstrated potential to reach at least 47 inches and a strong catch-and-release ethic among musky anglers we expect that many of fish we sampled in the 28- to 35-inch classes will survive and grow to 45 inches or longer.

Northern Pike

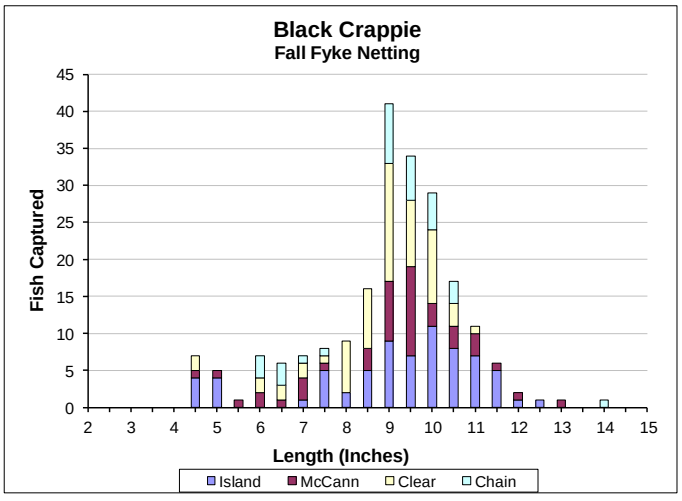
	Number per net-night ≥ 14"	Quality Size ≥ 21"	Preferred Size ≥ 28"	Memorable Size ≥ 34"
Island	0.6	100%	57%	0%
McCann	0.9	86%	0%	0%
Clear				
Chain	2.4	75%	25%	4%
Combined	1.1	82%	26%	3%



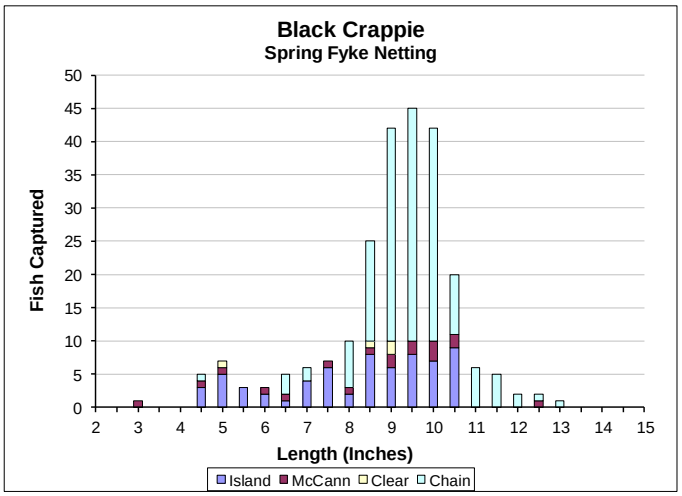
Our spring fyke net survey occurred too late to thoroughly represent adult northern pike population status as pike are typically the first fish to congregate and spawn immediately after and sometimes even before the ice thaws. Nonetheless, our netting samples suggest that the northern pike population's size structure and relative abundance among the lakes has changed little since our last survey in 2010. At low abundance the population again had satisfactory size structure with 26% of pike at least 28 inches long, identical to the combined share of preferred-size fish we found in 2010. Chain Lake again had the highest and Clear Lake had the lowest pike abundance in both 2010 and 2016. We did not capture any northern pike in Clear Lake during our spring fyke netting. At low density pike should have minimal impact on most other species in the Island Chain's fish community, though young pike might suppress natural muskellunge recruitment, especially in Chain Lake where spawning and nursery habitat of northern pike and muskies undoubtedly overlap.

Black Crappie

	Number per net-night ≥ 5"	Quality Size ≥ 8"	Preferred Size ≥ 10"	Memorable Size ≥ 12"
Island	6.6	85%	50%	3%
McCann	4.4	80%	27%	5%
Clear	10	89%	23%	0%
Chain	3.1	74%	29%	3%
Combined	5.6	83%	34%	2%



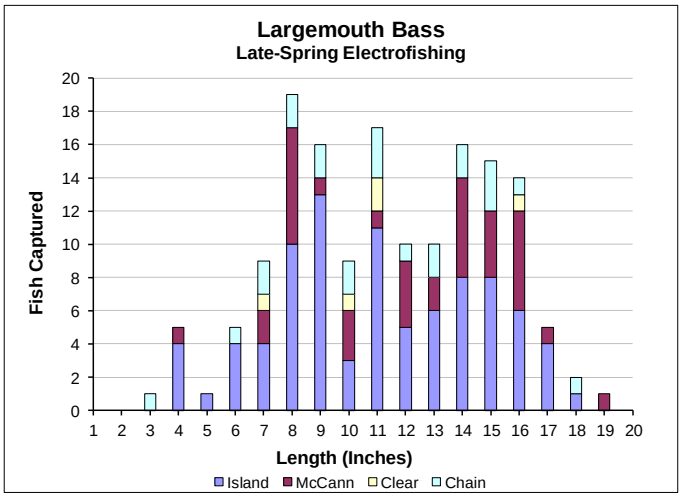
	Number per net-night ≥ 5"	Quality Size ≥ 8”	Preferred Size ≥ 10"	Memorable Size ≥ 12"
Island	5.1	66%	26%	0%
McCann	2.0	75%	38%	6%
Clear	0.7	75%	0%	0%
Chain	15	97%	37%	3%
Combined	6.4	87%	34%	2%



Fall and spring fyke nets revealed nearly identical characterizations of black crappie population status when net catches in the four lakes of the Chain are combined, even though catch rates in Clear and Chain lakes varied widely and inconsistently between spring and fall surveys. Our aggregated capture rates of black crappies in fall and spring fyke nets suggest a low to moderate population abundance with satisfactory size structure. Our size objective to have 25–35% of crappies at least 10 inches long is fulfilled across the Chain as a whole—34% were 10 inches or longer in both fall and spring fyke nets. We did not collect bony structures for age analysis, but we suspect that crappies continue to grow near the regional average rate as they did in 2010. Crappies over 12 inches were scarce in these surveys, but if growth rate is indeed adequate, some of the 9- to 10-inch fish that were plentiful in our samples should live long enough to reach memorable size, provided that angling pressure and harvest remain at the moderate levels estimated in the 2012–2013 creel survey.

Largemouth Bass

	Number per mile ≥ 8"	Number per hour ≥ 8"	Quality Size ≥ 12”	Preferred Size ≥ 15"
Island	19	42	51%	25%
McCann	18	41	67%	33%
Clear	8.0	13	25%	25%
Chain	6.3	15	53%	26%
Combined	14	32	54%	28%

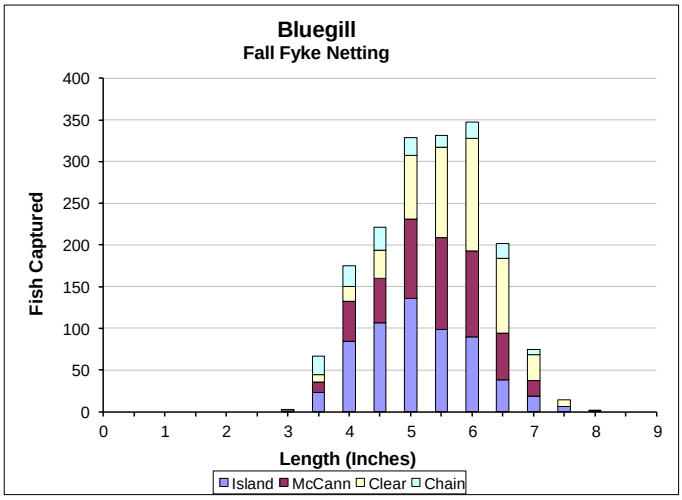


We captured largemouth bass in late spring at electrofishing rates that point to moderate population abundance in Island and McCann lakes and low abundance in Clear and Chain lakes. Under special harvest regulations in effect since 2011, anglers may keep up to 5 largemouth bass and smallmouth bass of any size and species combination. We encourage anglers to release all smallmouth bass and selectively harvest and eat largemouth bass 9–12 inches long to improve bass and walleye fishing

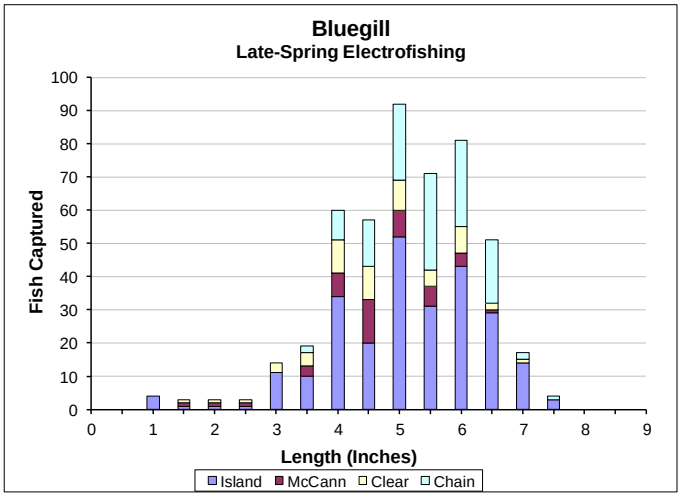
opportunity. Late spring electrofishing revealed progress toward lower abundance and improved size distribution in the largemouth bass population. Our measure of largemouth bass abundance decreased 35–81% in Chain, Clear, and Island lakes and increased 22% in McCann Lake, compared to our 2010 surveys. The overall capture rate for the entire Chain decreased just over half, while size structure improved. In our 2016 sample 28% of largemouth bass were ≥ 15 inches compared to only 10% attaining preferred size in 2010. We did not analyze largemouth bass growth in 2016, but we suspect that their growth rate has improved since 2010 when scales revealed that abundant bass grew very slowly. Since 2008 organizers have held six and planned one permitted bass fishing tournaments on the Island Chain of Lakes. Competitive anglers caught, held, and released 280 of the 282 largemouth bass and smallmouth bass registered in those contests. Almost half of the bass registered were identified to species, and of those 95% were largemouth bass.

Bluegill

	Number per net-night ≥ 3"	Quality Size ≥ 6"	Keeper Size ≥ 7"	Preferred Size ≥ 8"
Island	120	26%	4%	0.2%
McCann	51	36%	4%	0.2%
Clear	164	52%	8%	0%
Chain	16	28%	4%	0%
Combined	79	36%	5%	0.1%



	Number per mile ≥ 3"	Number per hour ≥ 3"	Quality Size ≥ 6"	Keeper Size ≥ 7"	Preferred Size ≥ 8"
Island	247	549	36%	7%	0%
McCann	84	183	12%	0%	0%
Clear	104	173	21%	2%	0%
Chain	250	568	38%	2%	0%
Combined	186	388	33%	5%	0%



Large samples from fall netting and late spring electrofishing portray a bluegill population in high abundance with a size structure, which in three of four lakes, meets our meager objective to have 20–40% of bluegills at least 6 inches long. Comparing electrofishing capture rates in 2010 and 2016,

bluegill abundance decreased by nearly half, but the proportion of keeper-size bluegill remained low, suggesting that their number is still too high. We did not need to analyze bluegill ages to know with reasonable certainty that crowding and intense competition for food and territory result in impaired growth and mediocre length distribution that probably will not satisfy most panfish anglers who want to keep bluegills for a meal. Only two of 2,245 bluegills measured in these surveys were 8.0–8.4 inches long, and Island Chain anglers kept only 16% of the estimated 58,836 bluegills they caught in the 2012–2013 creel survey. High bluegill abundance may stem from a shortage of parental males whose maturation trajectory may help control the population's reproductive success by behavioral and social mechanisms, but a more probable cause for high bluegill numbers is inadequate predation. Largemouth bass alone typically cannot eat enough bluegills to effectively control bluegill abundance in many northern Wisconsin lakes of this size. Muskellunge, northern pike, and longnose gar apparently offer little aide. However, if walleyes can rebound to the desired population density (2–4 adults/acre), their supplemental predatory pressure should help to control bluegill recruitment, reduce their abundance, and improve the growth rate and size structure in the bluegill population.

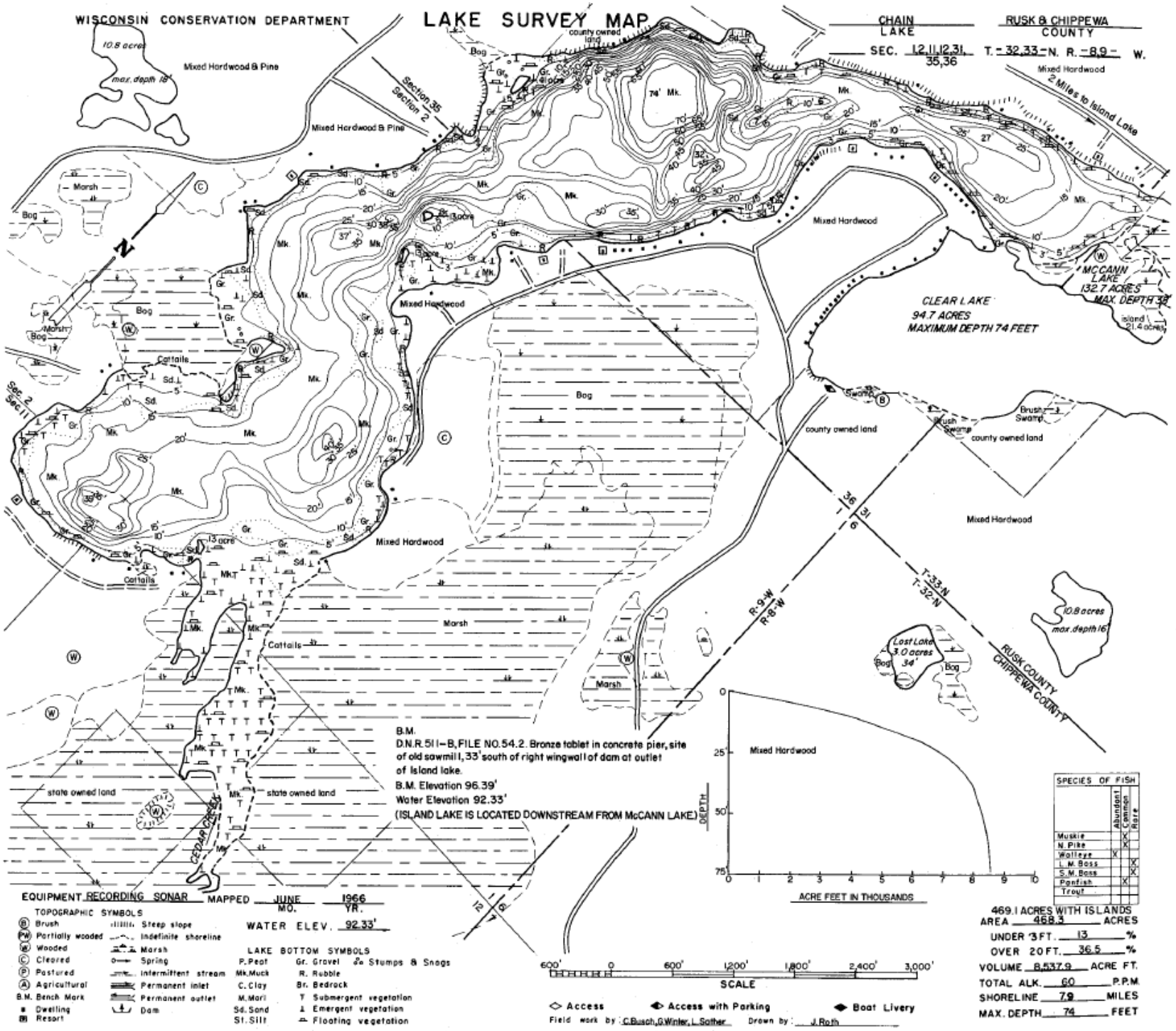
Survey data collected and analyzed by: Evan Sniadajewski, Matt Anchor, and Jeff Scheirer—WDNR Fishery Team, Park Falls.

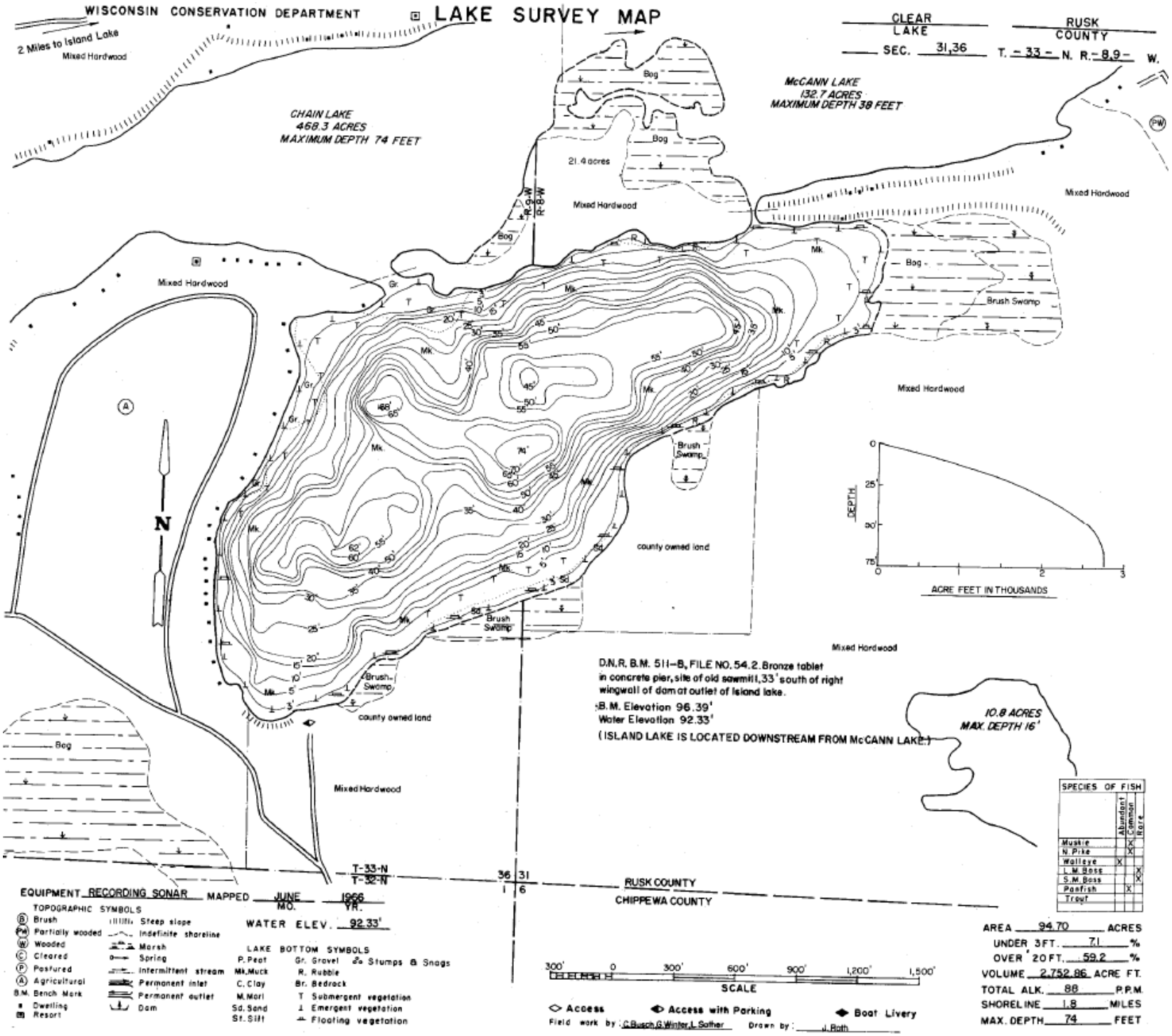
Written by: Chad Leanna—Fishery Technician, December 2016

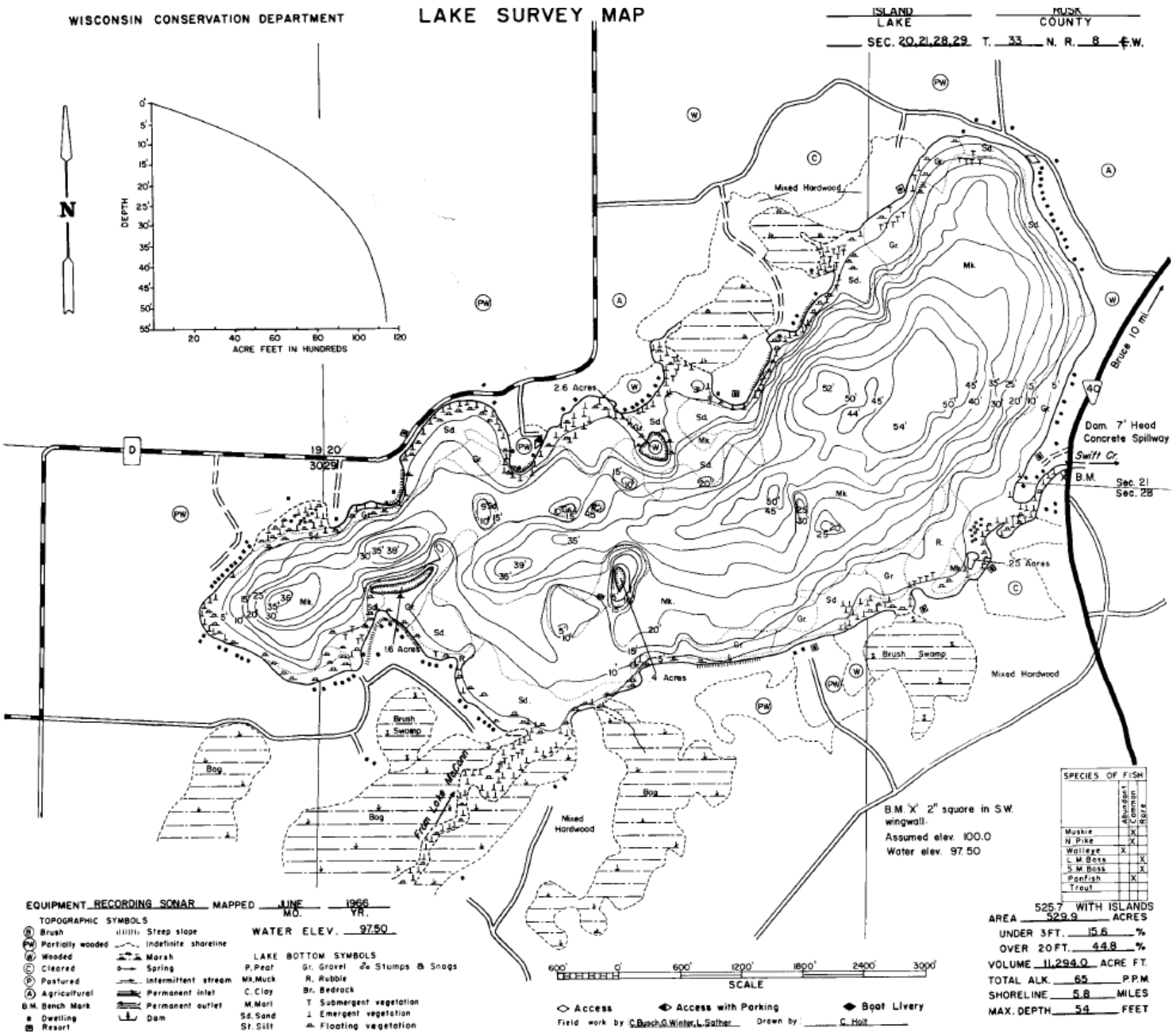
Edited by: Jeff Scheirer—Fishery Biologist, December 29, 2016.

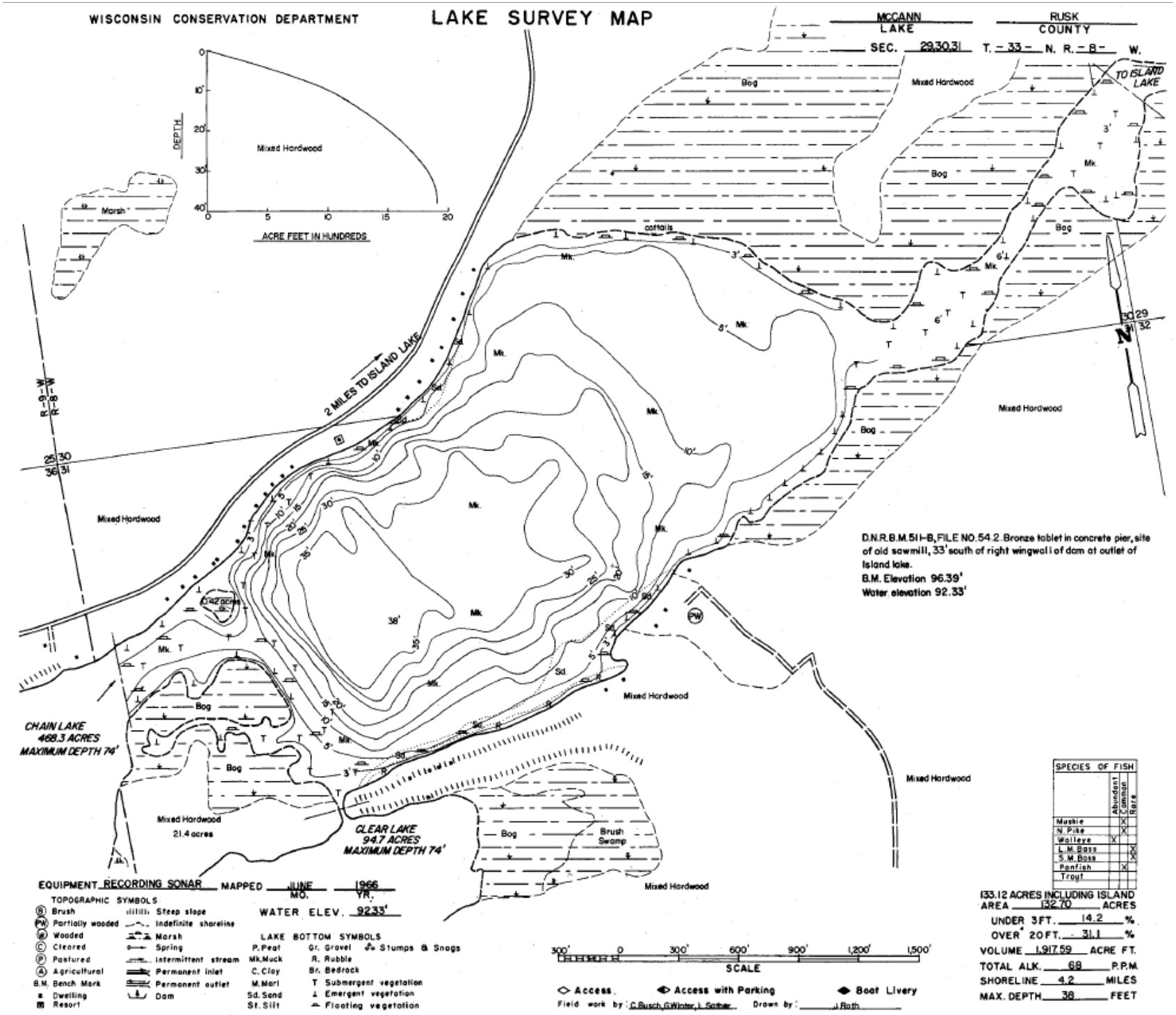
Reviewed by: Steve Gilbert—Woodruff Field Unit Supervisor, January 5, 2017.

Approved for web posting by: Mike Vogelsang—Northern Administrative District Supervisor, January 12th, 2017


WISCONSIN CONSERVATION DEPARTMENT
LAKE SURVEY MAP
CHAIN LAKE
RUSK & CHIPPEWA COUNTY
SEC. 12,11,12,31, 35,36 T.-32,33-N. R.-8,9- W.
CLEAR LAKE
94.7 ACRES
MAXIMUM DEPTH 74 FEET
McCANN LAKE
132.7 ACRES
MAX. DEPTH 38'
Island 21.4 acres
Lost Lake 3.0 acres 34'
10.8 acres max. depth 18'
10.8 acres max. depth 16'
13 acre
Mixed Hardwood
Mixed Hardwood & Pine
Marsh
Bog
Cattails
county owned land
state owned land
Section 35
Section 2
2 Miles to Island Lake
RUSK COUNTY
CHIPPEWA COUNTY
T-33-N
T-32-N
R-9-W
R-8-W
B.M.
D.N.R. 511-B, FILE NO. 54.2. Bronze tablet in concrete pier, site of old sawmill, 33' south of right wingwall of dam at outlet of Island lake.
B.M. Elevation 96.39'
Water Elevation 92.33'
(ISLAND LAKE IS LOCATED DOWNSTREAM FROM McCANN LAKE)
DEPTH
ACRE FEET IN THOUSANDS
SPECIES OF FISH
Abundant
Common
Rare
Muskie
N. Pike
Walleye
L.M. Bass
S.M. Bass
Panfish
Trout
EQUIPMENT RECORDING SONAR MAPPED JUNE 1966
MO. YR.
WATER ELEV. 92.33'
TOPOGRAPHIC SYMBOLS
LAKE BOTTOM SYMBOLS
SCALE
Access
Access with Parking
Boat Livery
Field work by: C.Busch, G.Winter, L.Sather
Drawn by: J.Roth
469.1 ACRES WITH ISLANDS
AREA 468.3 ACRES
UNDER 3 FT. 13 %
OVER 20 FT. 36.5 %
VOLUME 8,537.9 ACRE FT.
TOTAL ALK. 60 P.P.M.
SHORELINE 7.9 MILES
MAX. DEPTH 74 FEET


WISCONSIN CONSERVATION DEPARTMENT
LAKE SURVEY MAP
CLEAR LAKE
RUSK COUNTY
SEC. 31,36 T. 33 N. R. 8,9 W.
2 Miles to Island Lake
Mixed Hardwood
CHAIN LAKE
468.3 ACRES
MAXIMUM DEPTH 74 FEET
McCANN LAKE
132.7 ACRES
MAXIMUM DEPTH 38 FEET
Bog
21.4 acres
Mixed Hardwood
Brush Swamp
county owned land
DEPTH
ACRE FEET IN THOUSANDS
D.N.R. B.M. 511-B, FILE NO. 54.2. Bronze tablet in concrete pier, site of old sawmill, 33' south of right wingwall of dam at outlet of Island lake.
B.M. Elevation 96.39'
Water Elevation 92.33'
(ISLAND LAKE IS LOCATED DOWNSTREAM FROM McCANN LAKE.)
10.8 ACRES
MAX. DEPTH 16'
SPECIES OF FISH
Muskie
N. Pike
Walleye
L.M. Bass
S.M. Bass
Panfish
Trout
T-33-N
T-32-N
RUSK COUNTY
CHIPPEWA COUNTY
EQUIPMENT RECORDING SONAR MAPPED JUNE 1956
WATER ELEV. 92.33'
TOPOGRAPHIC SYMBOLS
LAKE BOTTOM SYMBOLS
SCALE
Access
Access with Parking
Boat Livery
Field work by: C.Busch, G.Winter, L.Sather
Drawn by: J. Roth
AREA 94.70 ACRES
UNDER 3FT. 7.1 %
OVER 20FT. 59.2 %
VOLUME 2,752.86 ACRE FT.
TOTAL ALK. 88 P.P.M.
SHORELINE 1.8 MILES
MAX. DEPTH 74 FEET


WISCONSIN CONSERVATION DEPARTMENT
LAKE SURVEY MAP
ISLAND LAKE
MUSK COUNTY
SEC. 20,21,28,29 T. 33 N. R. 8 E.W.
N
DEPTH
ACRE FEET IN HUNDREDS
Mixed Hardwood
2.6 Acres
Bruce 10 mi.
Dam. 7' Head Concrete Spillway
Swift Cr.
B.M.
Sec. 21
Sec. 28
25 Acres
16 Acres
4 Acres
Brush Swamp
Bog
Mixed Hardwood
FISH LAKE
B.M. 'X' 2" square in S.W. wingwall.
Assumed elev. 100.0
Water elev. 97.50
SPECIES OF FISH
Abundant
Common
Rare
Muskie X
N. Pike X
Walleye X
L.M. Bass X
S.M. Bass X
Panfish X
Trout
EQUIPMENT RECORDING SONAR MAPPED JUNE 1966
MO. YR.
WATER ELEV. 97.50
TOPOGRAPHIC SYMBOLS
Brush
Partially wooded
Wooded
Cleared
Pastured
Agricultural
B.M. Bench Mark
Dwelling
Resort
Steep slope
Indefinite shoreline
Marsh
Spring
Intermittent stream
Permanent inlet
Permanent outlet
Dam
LAKE BOTTOM SYMBOLS
P. Peat
Mk. Muck
C. Clay
M. Marl
Sd. Sand
St. Silt
Gr. Gravel
Stumps & Snags
R. Rubble
Br. Bedrock
T Submergent vegetation
Emergent vegetation
Floating vegetation
SCALE
Access
Access with Parking
Boat Livery
Field work by C. Busch, G. Winter, L. Sather
Drawn by C. Holt
AREA 529.9 ACRES
525.7 WITH ISLANDS
UNDER 3FT. 15.6 %
OVER 20FT. 44.8 %
VOLUME 11,294.0 ACRE FT.
TOTAL ALK. 65 P.P.M.
SHORELINE 5.8 MILES
MAX. DEPTH 54 FEET


WISCONSIN CONSERVATION DEPARTMENT
LAKE SURVEY MAP
McCANN LAKE
RUSK COUNTY
SEC. 29,30,31 T. - 33 - N. R. - 8 - W.
TO ISLAND LAKE
DEPTH
Mixed Hardwood
ACRE FEET IN HUNDREDS
Marsh
Bog
cattails
Mk.
2 MILES TO ISLAND LAKE
R-9-W
R-8-W
25 30
36 31
29 32
N
Mixed Hardwood
D.N.R.B.M.5II-B, FILE NO.54.2. Bronze tablet in concrete pier, site of old sawmill, 33' south of right wingwall of dam at outlet of Island lake.
B.M. Elevation 96.39'
Water elevation 92.33'
0.42 acres
PW
Sd.
CHAIN LAKE
468.3 ACRES
MAXIMUM DEPTH 74'
Mixed Hardwood
21.4 acres
CLEAR LAKE
94.7 ACRES
MAXIMUM DEPTH 74'
Brush Swamp
SPECIES OF FISH
Abundant
Common
Rare
Muskie
N. Pike
Walleye
L.M. Bass
S.M. Bass
Panfish
Trout
EQUIPMENT RECORDING SONAR MAPPED JUNE 1966
MO. YR.
WATER ELEV. 923.3'
TOPOGRAPHIC SYMBOLS
B Brush
PW Partially wooded
W Wooded
C Cleared
P Pastured
A Agricultural
B.M. Bench Mark
Dwelling
Resort
Steep slope
Indefinite shoreline
Marsh
Spring
Intermittent stream
Permanent inlet
Permanent outlet
Dam
LAKE BOTTOM SYMBOLS
P. Peat
Mk. Muck
C. Clay
Sd. Sand
St. Silt
Gr. Gravel
Stumps & Snags
R. Rubble
Br. Bedrock
T Submergent vegetation
Emergent vegetation
Floating vegetation
300' 0 300' 600' 900' 1,200' 1,500'
SCALE
Access
Access with Parking
Boat Livery
Field work by: C.Busch, G.Winter, L. Sather
Drawn by: J. Roth
133.12 ACRES INCLUDING ISLAND
AREA 132.70 ACRES
UNDER 3FT. 14.2 %
OVER 20FT. 31.1 %
VOLUME 1,917.59 ACRE FT.
TOTAL ALK. 68 P.P.M.
SHORELINE 4.2 MILES
MAX. DEPTH 38 FEET